Trend Study 17-42-02

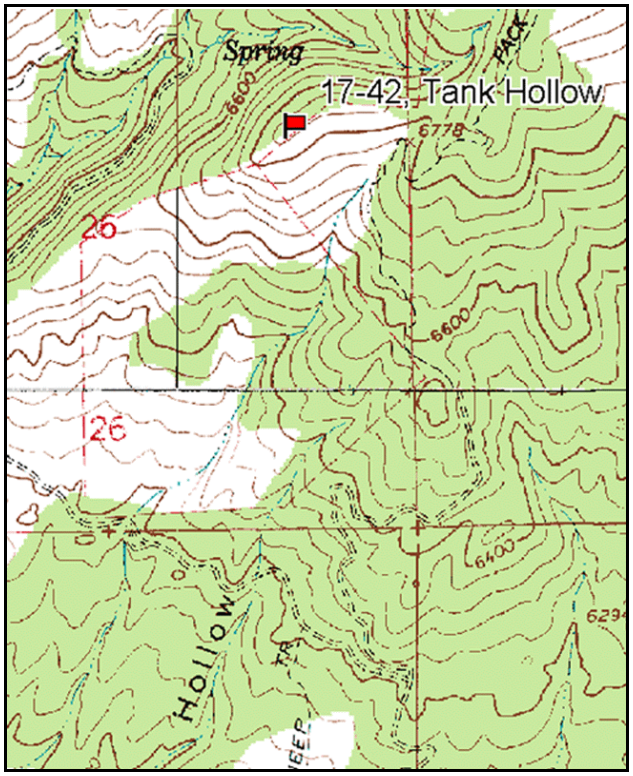
Study site name: Tank Hollow . Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 191 degrees magnetic.

Frequency belt placement: line 1 (11 & 95 ft), line 2 (34 ft), line 3 (59 ft), line 4 (71 ft). Rebar: belt 5 on 3ft.

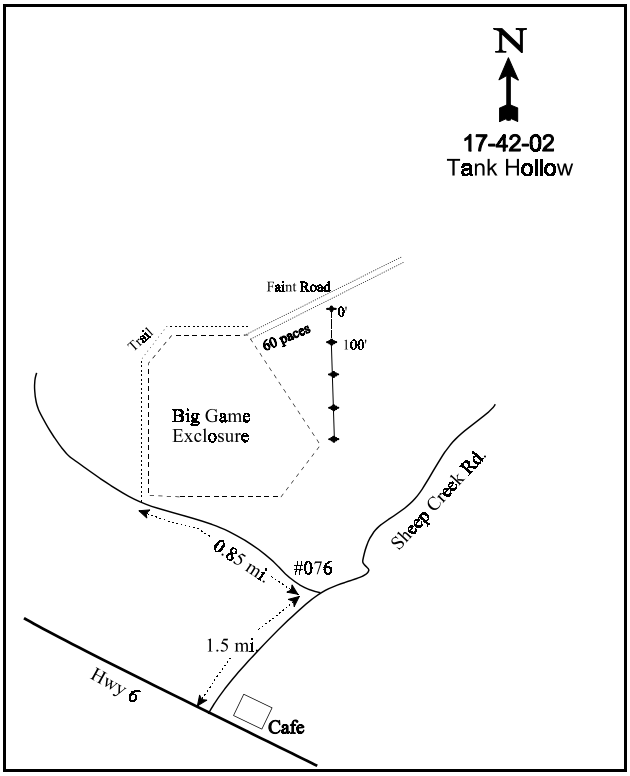
LOCATION DESCRIPTION

Turn north off of Highway US-6 (near mile post 195) onto the new Sheep Creek Road. Go 1.5 miles on the paved road to an intersection with Forest Service road #076. Turn left and go west 0.8 miles to a fence. Continue 0.05 miles on the road to the southwest corner of a large exclosure. Park here, and follow the trail along the outside of the exclosure to the northeast corner. Continue 60 paces northeast along an old road, the 0-foot stake is 3 paces off the right side of the road. The study runs south. The 0-foot stake is marked by browse tag #176.



Map Name: Ray's Valley

Township 9S , Range 5E , Section 26



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4428252 N 471835 E

DISCUSSION

Tank Hollow - Trend Study No. 17-42

This trend study is on the south side of a small knoll located immediately north of the large big game exclosure in Tank Hollow. Much of the surrounding area is dense oakbrush and north facing mahogany slopes. Below the study area, mixed juniper-pinyon and big sagebrush have been chained and seeded to help improve forage conditions. The study site itself is a mountain brush type on a moderate (20%), south to southeast slope at an elevation of 6,800 feet. This area is a known deer wintering area which in recent years, has experienced increasing elk use. Pellet groups of both species were abundant in 1997 and 2002. A pellet group transect read along the study baseline in 2002 estimated 155 deer days use/acre (384 ddu/ha) and 49 elk days use/acre (121 edu/ha). Most of the deer and elk pellet groups were from winter use. It appears that big game have used this site heavily for the past few years due in part to mild winters. The nearby exclosure fence is compromised in several areas and big game have used the area inside the large exclosure heavily also.

Soil on the site is relatively deep with little rock or pavement on the surface. Soil texture is a clay loam with a neutral reactivity (pH 7.1). There are rocks throughout the profile with a B horizon located about 30 inches below the surface. Effective rooting depth is almost 17 inches and soil temperature is a cool 46° F. The soil is limiting for both phosphorous and potassium as values are below minimum thresholds. These low values could be restrictive to plant development and growth. Although the site is potentially erodible, it appears to be relatively stable. A combination of abundant vegetation and litter cover, with the moderate slope helps limit erosion. Some slight soil movement was reported in the past, but the erosion condition class was determined as stable in 2002.

The site supports several preferred browse species which includes: serviceberry, mountain big sagebrush, true mountain mahogany, and antelope bitterbrush. Mountain big sagebrush and bitterbrush are the most abundant and combined they produce 68% of the total browse cover in 1997. Although, this declined to 54% in 2002. Mountain big sagebrush density was estimated at about 1,700 plants/acre in 1997 and 2002. Percent decadency was high at 56% in 1989, dropping to 31% in 1997. Drought conditions combined with heavy use have caused the number of decadent sagebrush to climb to 65% in 2002. Utilization has been consistently moderate to heavy from 1983 to 1997. It was classified as mostly heavy in 2002. The number of plants displaying poor vigor has steadily increased with each reading. No seedling sagebrush have been encountered on site and young recruitment continues to be poor. Annual leader growth on sagebrush averaged 2 inches in 2002.

The bitterbrush population has had a stable population of about 2,000 plants/acre since the site was established in 1983. It also has displayed consistent moderate to heavy use from 1983 to 1997 with very heavy use reported in 2002. Drought conditions combined with heavy use have dramatically effected this population. The number of plants displaying poor vigor has increased from 0% in 1997 to 48% in 2002. In addition, 85% of the population was classified as decadent in 2002, with half of these plants appearing to be dying due to excessive crown death. Recruitment is poor and the population appears primed for a die-off, especially if precipitation patterns do not return to normal. Bitterbrush leaders averaged only 1.7 inches of annual growth in 2002. True mountain mahogany density has remained stable since 1997 at about 350 plants/acre, but it too is showing the effects of drought and heavy use. Over half of the population displayed poor vigor in 2002 and 68% are decadent. Serviceberry have a population of about 200 plants/acre. They show identical trends of extremely heavy use, increased poor vigor, and decadence.

The most abundant shrub on the site is broom snakeweed with an estimated density of 5,420 plants/acre in 1997. Young plants were common and it appeared that the population was expanding. Drought conditions have caused this population to decline to 3,840 plants/acre and the number of decadent plants to increase from 0% to 27%.

Photos from all years show an obvious increase in the size of Utah juniper. Point-center quarter data from 2002 estimated Utah juniper density at a relatively low 40 trees/acre with an average diameter of 5.6 inches. A few scattered pinyon pine trees are also found on the site. Other scattered species include stickyleaf low rabbitbrush, snowberry, Gambel oakbrush, Oregon grape, and prickly pear cactus.

Grass composition is moderately diverse with crested wheatgrass providing about two-thirds of the total grass cover in 2002. Other common grasses include intermediate wheatgrass, bluebunch wheatgrass, and Sandberg bluegrass. Cheatgrass is scattered throughout the site but is not abundant. Overall grass utilization is light and vigor is good.

As reported in 1983, forbs are more abundant and certainly more diverse than grasses. Species composition is a mixture that generally is of fair forage value. Common forbs include thistle, tapertip hawksbeard, stickseed, longleaf phlox, Lewis flax, and American vetch. Drought conditions in 2001 and 2002 have caused a dramatic decline in perennial forb frequency and cover. Utilization of forbs has been light.

1983 APPARENT TREND ASSESSMENT

According to the apparent trend evaluation rating, soil trend appears stable for all nine graded categories. Vegetative trend is less certain. Mountain big sagebrush may be declining and Utah juniper shows evidence of a slow increase. Other browse species are vigorous but rather heavily hedged. Herbaceous plants are stable and of good quality. The principle threat to this area is increased activity associated with oil and gas exploration and road building activity.

1989 TREND ASSESSMENT

An increase in the percent vegetative basal cover from 1% to 14%, with the concurrent decrease in bare soil from 30% to 23%, indicate an improving trend. The rocky, clay loam soil shows evidence of slight erosion and compaction. On the study site itself, the mountain big sagebrush, bitterbrush, serviceberry, and mountain mahogany tend to be heavily hedged, more so than in 1983. However, densities of these species have remained stable and vigor is generally good. The herbaceous understory is still moderately dense and diverse. The data indicate a fairly stable population.

TREND ASSESSMENT
soil - up slightly (4)
browse -stable (3)
herbaceous understory - stable (3)

1997 TREND ASSESSMENT

Soil trend is slightly upward. Vegetative and litter cover are abundant and there is little erosion apparent. Percent bare ground has declined through all years. Browse trend is stable with only slightly less utilization then reported in the past. Seedling recruitment is low for nearly all species. The herbaceous understory trend is stable. The sum of nested frequency for perennial grasses and forbs has changed only slightly over the years.

TREND ASSESSMENT
soil - slightly upward (4)
browse - stable (3)
herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Soil trend is down slightly due to drought conditions for the past few years. Vegetative cover has declined from 53% in 1997 to 38% in 2002. Litter cover has declined slightly while cover of bare ground has nearly doubled (12% to 23%). In addition, cover of herbaceous vegetation has declined from 30% in 1997 to 15% in 2002. The soil erosion condition class was determined as stable in 2002. Trend for the key browse species, mountain big sagebrush and bitterbrush, is down slightly. It appears that these and other preferred browse forage on this site have sustained extremely heavy use for the past few years, likely due to mild winters. This heavy use combined with drought have caused an increase in the number of plants displaying poor vigor and decadence. Population densities remain at similar levels as 1997 estimates, but a large number of sagebrush and bitterbrush appear to by dying with little young recruitment to replace them. It appears that these populations will decline in the near future if drought conditions persist. Less abundant preferred browse species, serviceberry and true mountain mahogany also show extremely heavy use, poor vigor, and increased decadence. Unbrowsed annual leaders were hard to find on bitterbrush and mahogany. Leaders averaged 1.7 inches for bitterbrush and 2 inches for mahogany. Trend for the herbaceous understory is down. Sum of nested frequency of perennial grasses increased slightly while frequency of perennial forbs declined dramatically. Cover of perennial forbs was estimated at 16% in 1997 declining to only 3% in 2002. Lewis flax was common in 1997 with a quadrat frequency of 61% and a cover value of 6%. It accounted for 36% of the forb cover and 21% of the total herbaceous cover in 1997. Due to drought conditions, it was not sampled in any quadrats in 2002. Several other perennial forbs declined significantly.

TREND ASSESSMENT
soil - down slightly (2)
browse - down slightly (2)
herbaceous understory - down (1)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 42

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron cristatum	a29	ab62	b80	c126	11	23	27	45	5.39	7.13
G	Agropyron intermedium	a37	b52	ab49	ab45	17	18	16	19	2.48	1.44
G	Agropyron spicatum	48	51	27	24	20	17	11	11	1.02	1.70
G	Bromus carinatus	6	3	5	6	2	1	2	2	.06	.53
G	Bromus tectorum (a)	-	-	b70	a38	-	-	27	19	.93	.17
G	Oryzopsis hymenoides	6	5	6	9	4	3	2	4	.06	.21
G	Poa bulbosa	a-	a-	a-	b11	-	-	-	5	-	.12
G	Poa fendleriana	14	13	3	10	8	5	2	3	.01	.06
G	Poa pratensis	a-	a-	ab5	b11	-	-	2	5	.66	.10
G	Poa secunda	a-	a4	b43	b30	-	2	17	14	1.38	.63
G	Sitanion hystrix	3	-	-	-	1	-	-	-	-	-
Total for Annual Grasses		0	0	70	38	0	0	27	19	0.93	0.17
Total for Perennial Grasses		143	190	218	272	63	69	79	108	11.08	11.94
Total for Grasses		143	190	288	310	63	69	106	127	12.02	12.11
F	Agoseris glauca	-	-	-	12	-	-	-	4	.01	.02
F	Alyssum alyssoides (a)	-	-	-	3	-	-	-	2	-	.01

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Allium spp.	$_{a}$10	$_{b}$83	$_{a}$19	$_{a}$18	6	38	12	10	.06	.07
F	Arabis spp.	$_{b}$29	$_{a}$4	$_{a}$8	$_{a}$3	14	2	3	1	.04	.00
F	Artemisia dracunculus	3	-	-	-	1	-	-	-	-	-
F	Astragalus beckwithii	-	-	4	-	-	-	3	-	.21	-
F	Aster chilensis	23	17	24	13	8	6	8	5	.93	.15
F	Astragalus convallarius	-	-	10	-	-	-	4	-	.04	-
F	Astragalus spp.	-	-	2	-	-	-	1	-	.00	-
F	Balsamorhiza sagittata	-	-	1	3	-	-	1	1	.15	.15
F	Castilleja linariaefolia	-	-	4	-	-	-	2	-	.03	-
F	Camelina microcarpa (a)	-	-	14	17	-	-	6	10	.05	.25
F	Chenopodium album (a)	-	-	2	-	-	-	1	-	.00	-
F	Chaenactis douglasii	$_{b}$62	$_{a}$7	$_{a}$-	$_{a}$-	31	3	-	-	-	-
F	Cirsium spp.	$_{b}$55	$_{b}$36	$_{b}$50	$_{a}$2	29	18	25	2	1.75	.01
F	Collomia linearis (a)	-	-	8	-	-	-	4	-	.02	-
F	Comandra pallida	$_{bc}$19	$_{c}$27	$_{ab}$3	$_{a}$-	8	12	2	-	.02	-
F	Collinsia parviflora (a)	-	-	$_{b}$23	$_{a}$11	-	-	8	5	.04	.02
F	Crepis acuminata	$_{a}$7	$_{b}$45	$_{b}$56	$_{a}$10	4	23	26	6	.57	.23
F	Cryptantha spp.	7	-	-	-	4	-	-	-	-	-
F	Cymopterus spp.	$_{a}$-	$_{b}$44	$_{b}$33	$_{a}$-	-	22	18	-	.24	-
F	Descurainia pinnata (a)	-	-	7	8	-	-	3	3	.01	.06
F	Eriogonum brevicaule	$_{ab}$8	$_{b}$9	$_{a}$-	$_{ab}$3	3	5	-	1	-	.06
F	Erigeron pumilus	-	-	1	-	-	-	1	-	.00	.00
F	Hackelia patens	58	69	79	56	26	35	36	23	3.04	.76
F	Lappula occidentalis (a)	-	-	5	-	-	-	2	-	.01	-
F	Linum lewisii	$_{b}$42	$_{b}$27	$_{c}$161	$_{a}$-	20	16	61	-	6.36	-
F	Lithospermum ruderale	6	16	5	6	5	6	2	2	.33	.56
F	Machaeranthera canescens	$_{b}$75	$_{a}$3	$_{a}$7	$_{a}$1	39	2	3	1	.06	.03
F	Microsteris gracilis (a)	-	-	5	38	-	-	2	15	.01	.10
F	Penstemon humilis	$_{b}$19	$_{ab}$11	$_{ab}$8	$_{a}$3	8	7	3	1	.06	.03
F	Phlox longifolia	$_{b}$86	$_{b}$102	$_{a}$45	$_{a}$40	38	39	20	18	.29	.14
F	Polygonum douglasii (a)	-	-	1	-	-	-	1	-	.00	-
F	Senecio multilobatus	3	4	7	-	1	2	4	-	.09	-
F	Streptanthus cordatus	6	4	9	8	2	2	3	4	.16	.04
F	Taraxacum officinale	-	3	-	-	-	2	-	-	-	-
F	Tragopogon dubius	$_{c}$30	$_{ab}$4	$_{b}$17	$_{a}$-	19	2	7	-	.06	-
F	Trifolium spp.	-	-	-	2	-	-	-	1	-	.03
F	Veronica biloba (a)	-	-	$_{b}$155	$_{a}$-	-	-	49	-	1.44	-
F	Vicia americana	$_{a}$21	$_{a}$23	$_{b}$74	$_{b}$58	10	12	31	28	1.54	.44
F	Viola spp.	-	-	3	-	-	-	1	-	.00	-

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Zigadenus paniculatus	$_{ab}$2	$_{b}$9	$_{a}$-	$_{a}$-	2	5	-	-	-	-
Total for Annual Forbs		0	0	220	77	0	0	76	35	1.60	0.44
Total for Perennial Forbs		571	547	630	238	278	259	277	108	16.13	2.74
Total for Forbs		571	547	850	315	278	259	353	143	17.74	3.19

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 42

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Amelanchier alnifolia	8	9	.56	.57
B	Artemisia tridentata vaseyana	63	62	13.34	8.41
B	Cercocarpus montanus	12	12	1.14	1.60
B	Chrysothamnus viscidiflorus viscidiflorus	23	25	1.96	2.03
B	Gutierrezia sarothrae	53	56	1.99	1.87
B	Juniperus osteosperma	4	3	2.49	2.99
B	Mahonia repens	1	0	.03	-
B	Opuntia spp.	1	2	-	.01
B	Purshia tridentata	55	51	9.88	4.64
B	Quercus gambelii	3	4	.41	.15
B	Symphoricarpos oreophilus	25	30	2.11	1.64
Total for Browse		248	254	33.94	23.95

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 42

Species	Percent Cover	
	'97	'02
Amelanchier utahensis	-	.17
Artemisia tridentata vaseyana	-	5.92
Cercocarpus montanus	-	.83
Chrysothamnus viscidiflorus viscidiflorus	-	1.92
Gutierrezia sarothrae	-	.58
Juniperus osteosperma	2.0	.83
Purshia tridentata	-	2.67
Quercus gambelii	-	.17
Symphoricarpos oreophilus	-	1.83

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 42

Species	Average leader growth (in) '02
Artemisia tridentata vaseyana	2.0
Cercocarpus montanus	2.0
Purshia tridentata	1.7

Point-Quarter Tree Data
Herd unit 17, Study no: 42

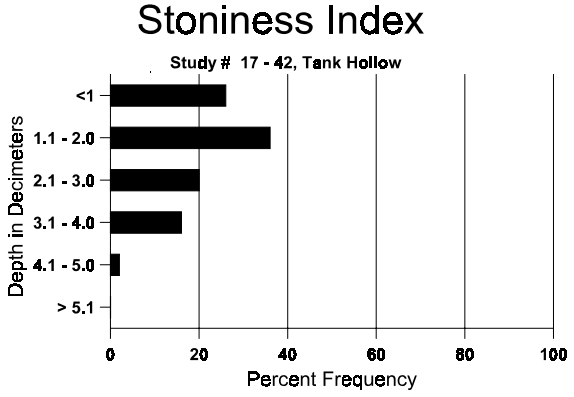
Species	Trees per Acre '97	Trees per Acre '02	Average diameter (in) '97	Average diameter (in) '02
Juniperus osteosperma	22	33	4.8	5.6

BASIC COVER --
Herd unit 17 , Study no: 42

Cover Type	Nested Frequency '97	Nested Frequency '02	Average Cover % '83	Average Cover % '89	Average Cover % '97	Average Cover % '02
Vegetation	358	305	1.25	14.00	52.99	38.21
Rock	155	130	4.50	5.75	4.18	3.29
Pavement	155	142	3.25	6.25	1.67	.88
Litter	396	382	61.00	51.25	53.51	50.02
Cryptogams	26	20	0	0	.31	.68
Bare Ground	234	260	30.00	22.75	11.94	23.39

SOIL ANALYSIS DATA --
Herd Unit 17 Study no: 42, Tank Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
16.5	46.4 (17.3)	7.1	25.4	34.7	39.8	3.4	6.9	64.0	.7



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 42

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'97	'02	'02	'02
Rabbit	1	6	-	-
Elk	36	20	635	49 (121)
Deer	38	52	2018	155 (384)
Cattle	-	4	61	5 (13)

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 42

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	1	-	-	1	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	2	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	2	-	1	-	1	-	-	4	-	-	-	80			4
M	83	-	1	-	-	-	-	-	-	-	1	-	-	-	66	25	17	1
	89	-	-	-	-	1	-	-	-	-	1	-	-	-	66	23	15	1
	97	2	-	1	2	-	1	-	-	-	6	-	-	-	120	32	33	6
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24	21	0
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	3	-	-	2	-	-	-	3	-	-	2	100			5
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	100%	00%	00%	+50%
'89	50%	00%	00%	+34%
'97	20%	20%	00%	-10%
'02	11%	78%	22%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	66	Dec:	0%
	'89	132		50%
	'97	200		0%
	'02	180		56%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	97	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	2	-	-	-	-	-	-	2	-	-	-	40			2
M	83	4	12	10	-	-	-	-	-	-	26	-	-	-	1733	31	37	26
	89	1	5	11	-	1	-	-	-	-	18	-	-	-	1200	24	43	18
	97	14	29	8	2	2	-	-	-	-	55	-	-	-	1100	30	46	55
	02	-	5	21	-	-	2	1	-	-	28	-	1	-	580	26	33	29
D	83	1	6	3	-	-	-	-	-	-	10	-	-	-	666			10
	89	6	5	13	-	-	1	-	-	-	19	-	1	5	1666			25
	97	3	16	3	3	2	-	-	-	-	7	-	-	20	540			27
	02	-	9	30	-	-	16	2	-	1	20	-	-	38	1160			58
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	50%	36%	00%	+20%
'89	27%	56%	13%	-43%
'97	57%	13%	23%	+ 3%
'02	16%	81%	44%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	2399	Dec:		28%
'89	2999			56%
'97	1720			31%
'02	1780			65%

Cercocarpus montanus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	1	-	-	-	1	-	-	2	-	-	-	40			2
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	3	10	-	-	2	-	-	-	14	1	-	-	300	33	40	15
	02	-	-	4	-	-	-	-	-	-	4	-	-	-	80	33	32	4
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	11	-	-	2	-	-	-	2	-	-	11	260			13

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	19%	75%	00%	+16%
'02	00%	95%	58%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		0%
'89	0			0%
'97	320			0%
'02	380			68%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	83	6	-	-	-	-	-	-	-	-	6	-	-	-	400	10	17	6
	89	8	-	-	-	-	-	1	-	-	9	-	-	-	600	11	13	9
	97	68	-	-	-	-	-	-	-	-	68	-	-	-	1360	12	17	68
	02	77	3	-	1	-	-	-	-	-	80	-	-	-	1620	9	13	81
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+33%
'89	00%	00%	00%	+59%
'97	00%	00%	00%	+14%
'02	04%	01%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	400	Dec:	0%
	'89	600		0%
	'97	1460		0%
	'02	1700		1%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	20	-	-	-	-	-	-	-	-	20	-	-	-	400			20
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	60	-	-	-	-	-	-	-	-	60	-	-	-	1200			60
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	36	-	-	-	-	-	-	-	-	36	-	-	-	2400	12	8	36
	89	42	-	-	5	-	-	1	-	-	48	-	-	-	3200	10	10	48
	97	210	-	-	-	-	-	-	-	-	210	-	-	-	4200	10	10	210
	02	138	-	-	2	-	-	-	-	-	138	2	-	-	2800	8	8	140
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	8	-	-	-	-	-	-	-	-	4	-	-	4	533			8
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	50	-	-	1	-	-	-	-	-	34	-	-	17	1020			51
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	1300			65

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+36%
'89	00%	00%	07%	+31%
'97	00%	00%	00%	-29%
'02	00%	00%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	2400	Dec:		0%
'89	3733			14%
'97	5420			0%
'02	3840			27%

Juniperus osteosperma																		
M	83	1	-	1	-	-	-	-	-	-	2	-	-	-	133	67	12	2
	89	-	-	-	1	-	-	-	-	-	1	-	-	-	66	106	79	1
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	82	79	4
	02	2	-	-	-	-	1	-	-	-	2	1	-	-	60	-	-	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	50%	00%	-50%
'89	00%	00%	00%	+18%
'97	00%	00%	00%	-25%
'02	00%	33%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	133	Dec:	-
'89	66		-
'97	80		-
'02	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Mahonia repens																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	3	-	-	3	-	-	-	60	3	6	3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'83	00%	00%	00%
'89	00%	00%	00%
'97	00%	00%	00%
'02	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	80		-
	'02	0		-

Opuntia spp.																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	5	1
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	7	1
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'83	00%	00%	00%
'89	00%	00%	00%
'97	00%	00%	00%
'02	00%	00%	67%

%Change

+67%

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	0%
	'89	0		0%
	'97	20		0%
	'02	60		33%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	89	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	97	6	7	1	-	-	-	-	-	-	14	-	-	-	280			14
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	20	4	4	-	-	-	-	-	-	27	1	-	-	1866	16	19	28
	89	-	7	12	-	3	1	-	-	-	23	-	-	-	1533	15	24	23
	97	4	22	19	2	22	15	-	-	-	84	-	-	-	1680	29	49	84
	02	-	2	12	-	-	1	-	-	-	15	-	-	-	300	12	26	15
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	5	1	-	-	-	-	-	-	7	-	-	-	466			7
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	6	55	3	-	26	-	-	1	40	-	-	51	1820			91
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	13%	13%	00%	- 0%
'89	48%	45%	00%	- 5%
'97	52%	36%	00%	+ 8%
'02	07%	89%	48%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	2066	Dec:	0%
	'89	2065		23%
	'97	1960		0%
	'02	2140		85%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	02	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	51	35	2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	27	0
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	3	1	-	-	-	-	-	4	80			4
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	+13%
'02	00%	38%	50%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	0%
	'89	0		0%
	'97	140		0%
	'02	160		50%

Ribes spp.																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	70	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'97	0		-
	'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
S	83	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	02	8	2	-	-	-	-	-	-	-	10	-	-	-	200			10
M	83	27	-	-	-	-	-	-	-	-	27	-	-	-	1800	19	14	27
	89	3	6	-	6	1	-	13	-	-	13	-	-	16	1933	15	14	29
	97	17	-	-	28	-	-	-	-	-	45	-	-	-	900	18	36	45
	02	21	4	1	3	2	-	-	-	-	31	-	-	-	620	12	24	31
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	2	3	1	-	-	-	-	-	6	-	-	1	140			7
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	- 6%
'89	22%	00%	50%	-53%
'97	00%	00%	00%	- 4%
'02	21%	08%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	2266	Dec:	0%
	'89	2133		0%
	'97	1000		0%
	'02	960		15%